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| 10/783,143 | 02/19/2004 | Stephan Lutgen | 5367-88 | 7030 |

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COHEN, PONTANI, LIEBERMAN & PAVANE
Suite 1210
551 Fifth Avenue
New York, NY 10176

| EXAMINER | |
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| NGUYEN, TUAN N | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/783,143 | LUTGEN ET AL. | |
| | Examiner | Art Unit | |
| | TUAN N. NGUYEN | 2828 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2 and 4-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

***Response to Amendment***

1. In respond to applicant's amendment filed 04/29/2008, claim 1 has been amended. Claim 26 has been added.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-22, 25 are rejected under 35 U.S.C. 112, second paragraph. as being indefinite, vague, and confusing for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim contains subject matter not described in the specification in such as way as to enable one skilled in the art to understand what is the edge emitting optical pump source is, especially when the application's specification discloses the electrodes supply the pump radiation source (section [0057]). In addition, the specification (section [0055-0057]) discloses and (Fig 2) shows the monolithically integrated edged-emitting laser pump radiation source 3a, 3b locate or equivalent to mirror the mirror layer #5. The examiner assumes it is the mirror layer #5 resonates light from external pump source and/or from electrical source to emit optical output that pump the active layer as it exit the semiconductor laser. Hence, the electrodes are the pump radiation source, because if it is not the pump radiation source there is no need for the electrode. Furthermore, if there is an actual an edge emitting laser monolithic integrated into the semiconductor laser to pump the active layer, there is insufficient structure and function in the drawing and specification to enable one skilled in the art to understand the edge emitting optical

pump source. There is insufficient means, structure and functional relationship, which render the claims vague and indefinite. Claims 1-22 and 25 are rejected base on the same reason.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of 35 U.S.C. 102(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1, 2, 9-14, 16-18, 23-25 are rejected under 35 U.S.C. 102(a) as being unpatentable over Chilla (US 2003/0012247).

With respect to claim 1, Chilla ('247) shows and discloses a laser device for generating laser pulses with an optically pumped semiconductor laser *(Fig 2,6,7: 50, 70, 80)*, comprising: a semiconductor laser having an active layer *(section [0017])*; a first pump radiation source ~~which is~~ monolithically integrated into the semiconductor laser and configured to optically pump said active layer *(Fig 7), the first pump radiation source being an edge emitting laser (Section [0022] Bragg mirror (Fig 2: 14), is the same as mirror layer #5 in Applicant specification, that is edge emitting from the mirror and pump radiation source into the active layer #16)*; an external resonator *(section [0018])(Fig 2,6,7)*; and at least one mode-locker *(sections [0021][0037])*.

With respect to claim 2, wherein the semiconductor laser is optically pumped by means of a second pump radiation source arranged externally *(Fig 6, 2)*.

With respect to claim 9, 10 Chilla ('247) discloses wherein the resonator has a device for phase compensation, and arranged downstream of the resonator *(Fig 7, 8) (section [0037])*.

With respect to claims 11, 12 Chilla ('247) discloses the use of the optical fiber in the phase compensation, and the folding mirror *(Fig 6, 7, 8)*.

With respect to claims 13,14 (Fig 1, 7) shows the resonator has a first resonator branch for generating laser pulses having a wavelength, and a second resonator branch for generating laser pulses having a second wavelength, and the pulses are coupled to one another in a phase-locked manner (Fig 8) (section [0038-0039]).

With respect to claims 16-18, the claims further require that the laser is a laser oscillator, amplifier, or CPA amplifier (Fig 2, 6-8)..

With respect to claim 23 Chilla ('247) discloses a laser device for generating laser pulses *(Fig 1, 2, 6, 7)* with an optically pumped semiconductor laser *(Fig 2, 6: 30)*, comprising: an external resonator *(Fig 6: 74)*, and at least one mode-locker wherein the resonator has a phase compensation element, said phase compensation element compensating for group velocity dispersion *(sections [0021][0037]; Abstract)*.

With respect to claim 24, Chilla ('247) discloses the phase element compensation is integrated into the semiconductor laser *((section 0037])*.

With respect to claim 25, Chilla '247 further shows (Fig 7: the first radiation source electrodes are arranged lateral to active layer).

5. Claims 23-24, 26 are rejected under 35 U.S.C. 102(a) as being unpatentable over Paschotta (WO 01/59895).

With respect to claim 23 Paschotta (WO 01/59895) discloses a laser device for generating laser pulses *(Fig 1: 21, 1, 10 semiconductor device generating laser pulses 10, 10'; Fig 7: 2)* with an optically pumped semiconductor laser *(Fig 1,7: 7) (Page 12: 5-15 diode pumping laser)*, comprising: an external resonator *(Fig 7, 8: 12 external resonator)(Page 11: 10-24 first reflective and second reflective element 11, 12, "active mirror element")*, and at least one mode-locker *(Fig 1,7: 5)(Page 11: 15-20 SESAM semiconductor saturable absorber mirror)(Title: Passively mode-lock optically pumped semiconductor external-cavity laser) (Page 3: 10-20, passive mode locking technique relies on saturable absorber mechanism)*, wherein the resonator has a phase compensation element, said phase compensation element compensating for group velocity dispersion*(ABSTRACT )(Page 11: 15-22 phase compensation saturable absorber mirror SESAM 5 and/or Bragg reflector compensating for velocity dispersion).*

With respect to claim 24 Paschotta (WO 01/59895) discloses the phase element compensation is integrated into the semiconductor laser *(Page 11: 19-22 the bragg reflector part of the semiconductor made of semiconductor and locking a desired wavelengths) (Page 5: 5-10 passively mode –locked incorporated into the semiconductor structure; page 7: 5-10 – passive mode-locked based on ion-doped crystal ; Page 13).*

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paschotta (WO 01/59895).

With respect to claim 26 Paschotta (WO 01/59895) discloses a laser pulses with an optically pumped semiconductor laser *(Fig 1,7: 7) (Page 12: 5-15 diode pumping laser)*, comprising:

an external resonator *(Fig 7, 8: 12 external resonator)*; and

at least one mode-locker*(Title: Passively mode-lock optically pumped semiconductor external-cavity laser) (Page 3: 10-20, passive mode locking technique relies on saturable absorber mechanism) (Fig 1,7: 5)(Page 11: 15-20 SESAM semiconductor saturable absorber mirror)*,

wherein the external resonator comprises a phase compensation element for compensating for group velocity dispersion *(ABSTRACT )(Page 11: 15-22 phase compensation saturable absorber mirror SESAM 5 and/or Bragg reflector compensating for velocity dispersion)(Section [0022]).* The claim further require the phase compensation element being a chirped mirror integrated in a semiconductor body of the semiconductor laser. One skill in the art would recognize chirped mirror is a dielectric mirror with varying spaces to reflect varying wavelengths of light where mirror an ordinary mirror made to reflect a single frequency of light; Paschotta (WO 01/59895) did not discreetly state a chirped mirror, however Paschotta (WO 01/59895) disclose the Bragg mirror structure (sections [0022-0025]) support plurality of modes wavelengths. Hence, Paschotta (WO 01/59895) mirror is an equivalent mirror that capable of performing the same function as chirped mirror.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or non-obviousness.

8. Claims 4-8, 15, 19-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Chilla (US 2003/0012247) in view of Paschotta (WO 01/59895).

With respect to claims 4, 5, 6 Chilla ('247) shows and discloses the above. The claims further require a passive mode-locker that is a saturable absorber made of semiconductor material. Chilla ('247) did not discreetly disclose a saturable absorber passive locker. Paschotta (895) discloses a similar laser device optically pumped semiconductor laser having an active layer with an external resonator, and at least one passive semiconductor mode-locker saturable absorber *(Title; Fig 1,7: 5)(Page 11: 15-20 SESAM)(Page 3: 10-20)*. It would have been obvious to one of ordinary skill in the art to provide Chilla ('247) with the a saturable absorber

passive locker as taught or suggested by Paschotta (895), for the benefit of decreasing loss with increasing optical intensity.

With respect to claim 7 Paschotta (WO 01/59895) discloses the mode-locker is monolithically integrated into the semiconductor laser *(p 11: 19-22) (p 5: 5-10; p 7: 5-10; p 13)*.

With respect to claim 8, Paschotta (WO 01/59895) discloses the mode-locker (10) is combined with a resonator mirror (9) *(Page 13: 22-26: SESAM 5) (Page 17: Table 1)*.

With respect to claim 15 Paschotta (WO 01/59895) discloses the laser pulses have a pulse duration which is less than 100 ps *(Page 12: 23 pulse of 26ps)(Page 14: 19 – 25.7ps)*

With respect to claims 19, 20 Paschotta (WO 01/59895) shows the mode-locker is arranged in said external resonator, or arranged internally and part is arranged externally of the semiconductor laser. *(Fig 1: 5, 12, 8, 4)(Fig 7: 4,5,12) (Fig 8,9: 12,5)*.

With respect to claims 21, 22, the claims further require that the laser pulse duration is less then 20ps and 1ps. Paschotta (WO 01/59895) discloses the laser pulses have a pulse duration around 19-25.7ps *(Page 12: 23 pulse of 26ps)(Page 14: 19 – 25.7ps)*. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum ranges involves only routine skill in the art.

***References***

9. The prior art made of record and relied upon is considered pertinent to applicant's discloses.

Albrecht et al. (US 2002/0001328); Kinoshita (US 6535537), Schmid et al. (US 7224710) show and discloses monolithic integrated optical pump semiconductor device having electrode as its pump radiation source.

**Response to Argument**

10. Applicant's arguments filed on 04/29/2008 have been fully considered but they are not persuasive.

Page 8-9, Applicant pointed out specification disclosure of *"first pump radiation source (3a, 3b) integrated into the semiconductor, and the active layer (4) is optically pumped by the monolithically integrated first pump radiation source (3a,3b)"; in addition, claim 1 has been amended to recite "the first pump radiation source being an edge emitting laser". The Applicant pointed out reference Chilla using "an electrically pump" therefore cannot act as a pump radiation source to optically pump an active layer. Furthermore, claim 1 also recites "at least one mode-locker" because "one skilled in the art appreciate a mode-locker is a device for generating short laser pulses", and there is no indication Chilla device create short laser pulses.* The examiner stands, read the above rejection for monolithically integrated pump radiation source being an edge emitting laser. In addition, Chilla (section [0022-0025]) discloses the short laser pulses 970nm.

Page 10, Applicant points out independent claim 23 recites *"at least one mode-locker" and that "the resonator has a phase compensation element... compensating for group velocity*

*dispersion" and these features are not disclosed in either references Chilla or Paschotta. There is no teaching in Chilla of a laser device for generating laser pulses or of either a mode-locker or a phase compensation element as recited in independent claim 23.* The examiner stands, reference Chilla discloses the above – see above rejection- of a laser device for generating laser pulses (Fig 4,5: laser generate pulses) or of either a mode-locker (section [0022-0025] short pulses 970nm) or a phase compensation element *(sections [0021][0037]; phase matching/phase compensate)*as recited in independent claim 23.

Page 10-12, Applicant point out Paschotta does not disclose the above claim feature recited in independent claim 23 where *"said phase compensation element compensating for group velocity dispersion" Thus, claim 23 recites a phase compensation element that compensates for group velocity dispersion. "Group velocity" refers to the speed at which the centroid of a wave package moves in a medium. The dependence of the group velocity on frequency is referred to as the group velocity dispersion. See paragraph [0066].* On page 5 of the Office Action, the Examiner alleged Paschotta discloses a "phase compensation saturable absorber mirror SESAM 5 and/or Bragg reflector compensating for velocity dispersion" to the Abstract and to page 11, lines 15-22, but fail to explain or provide justification that saturable absorber mirror (5) and Bragg reflector qualifies as phase compensation element compensating for group velocity dispersion. The examiner stands, first as pointed out by the Applicant "Group velocity" is the speed of wavelength centroid moves in a medium shows in (Fig 4,5,6); Second, absorber mirror 5 function is to absorb certain wavelengths but not others, and the Bragg reflector use in waveguide to cause a partial reflection of an optical wave and many reflections combine with constructive interference, hence the cited elements equivalent to *phase*

*compensation element compensating for group velocity dispersion.* The examiner stands that the claims language are broad enough that can be interpret by different elements, and were properly noted in the office action corresponding to the claim feature.

Page 13, Applicant point out *new independent claim 26 recites the claim features of 23 in addition to "the phase compensation element is a chirped mirror integrated in a semiconductor body of the semiconductor laser".* The examiner stands, see the above rejection.

## *Conclusion*

11. Applicant's amendment necessitated the new and old ground(s) of rejection presented in this office action. Amendment Accordingly**, THIS ACTION IS MADE FINAL.** See MPEP 706.07. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

## *Communication Information*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TUAN N. NGUYEN whose telephone number is (571) 272-1948. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harvey Minsun can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tuan N Nguyen/

Examiner, Art Unit 2828

/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828

| Application Number | Application/Control No. | Applicant(s)/Patent under Reexamination | |
|---|---|---|---|
| | 10/783,143 | LUTGEN ET AL. | |
| | Examiner | Art Unit | |
| | TUAN N. NGUYEN | 2828 | |